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United States Patent [19]**Börner et al.**[11] **Patent Number:** **5,756,224**[45] **Date of Patent:** **May 26, 1998**[54] **ORGANIC ELECTROLUMINESCENT COMPONENT**[75] **Inventors:** **Herbert Friedrich Börner**, Hamburg;
Ulrich Kynast, Roetgen; **Wolfgang Busselt**; **Markus Haase**, both of Aachen, all of Germany[73] **Assignee:** **U.S. Philips Corporation**, New York, N.Y.[21] **Appl. No.:** **513,373**[22] **Filed:** **Aug. 10, 1995**[30] **Foreign Application Priority Data**Aug. 11, 1994 [DE] Germany 44 28 450.0
Aug. 17, 1994 [EP] European Pat. Off. 94202340[51] **Int. Cl.⁶** **H05B 33/14**[52] **U.S. Cl.** **428/690; 428/917; 313/503;**
313/504[58] **Field of Search** 428/690, 917;
313/504, 503[56] **References Cited****U.S. PATENT DOCUMENTS**

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Primary Examiner—Charles Nold*Attorney, Agent, or Firm*—Norman N. Spain[57] **ABSTRACT**

An organic electroluminescent component with a layer structure comprising

- a) a substrate layer,
- b) a first transparent electrode layer,
- c) one or several functional optoelectronic layer(s) with
 - c1) possibly, one or several p-type organic materials with one or several singlet states and one or several triplet states, and
 - c2) a luminescent material with one or several organo-metallic complexes of a rare earth metal ion with organic ligands, in which the rare earth metal ion has an emitting state and the organic ligands have one or several singlet states and one or several triplet states, and
 - c3) one or several n-type organic materials with one or several singlet states and one or several triplet states, and
- d) a second electrode,

wherein the triplet state of lowest energy of the ligands is lower than the triplet states of lowest energy of the n-type and/or the p-type organic materials but higher than above the emitting state of the rare earth metal ion excels through a surprisingly increased luminous efficacy, and in addition has a very good thermal stability while it can be manufactured in a simple process.

12 Claims, 2 Drawing Sheets